Tap Into Geothermal Power

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According to the U.S. Environmental Protection Agency (EPA), geothermal heat pumps are the most energy-efficient, environmentally clean, and cost-effective systems for temperature control.

Source: http://www.eia.doe.gov/kids/energyfacts/sources/renewable/geothermal.html

What IS geothermal energy?

When most people think of geothermal energy, they picture energy that can be accessed by drilling water or steam wells in a process similar to drilling for oil.

Credit: NPS Photo

In the U.S., most geothermal reservoirs of this type are located in the western states, Alaska, and Hawaii.

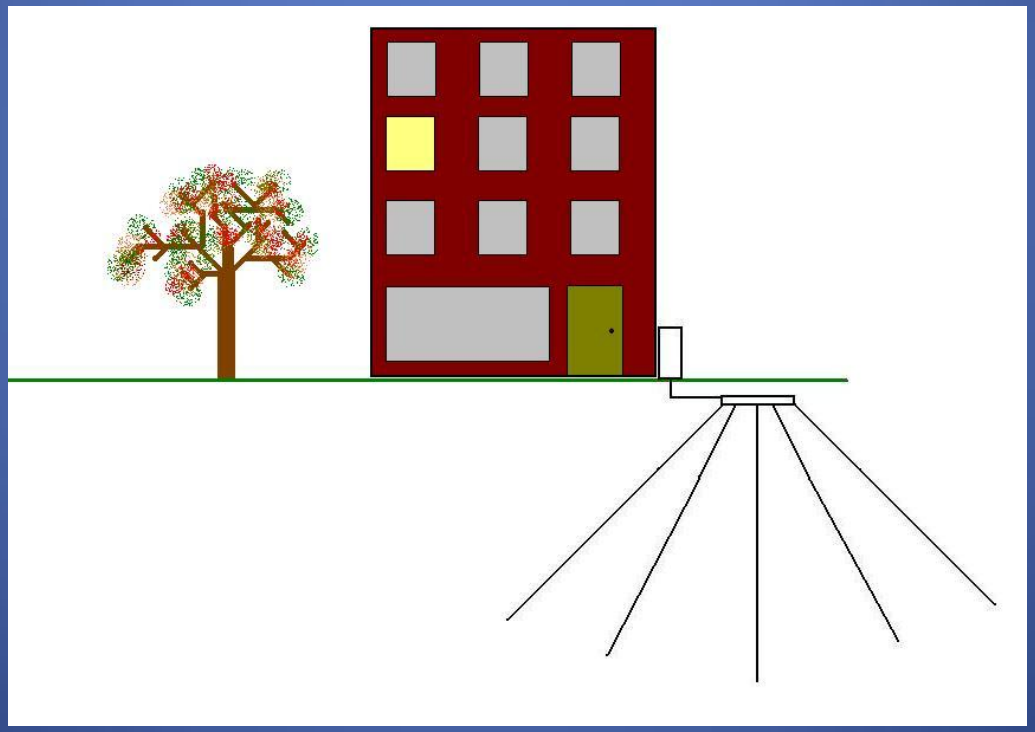
Credit: NPS Photo

However, almost everywhere, the Earth's surface (> 4 feet deep) maintains a nearly constant temperature between 50 and 60°F (10 and 16°C).

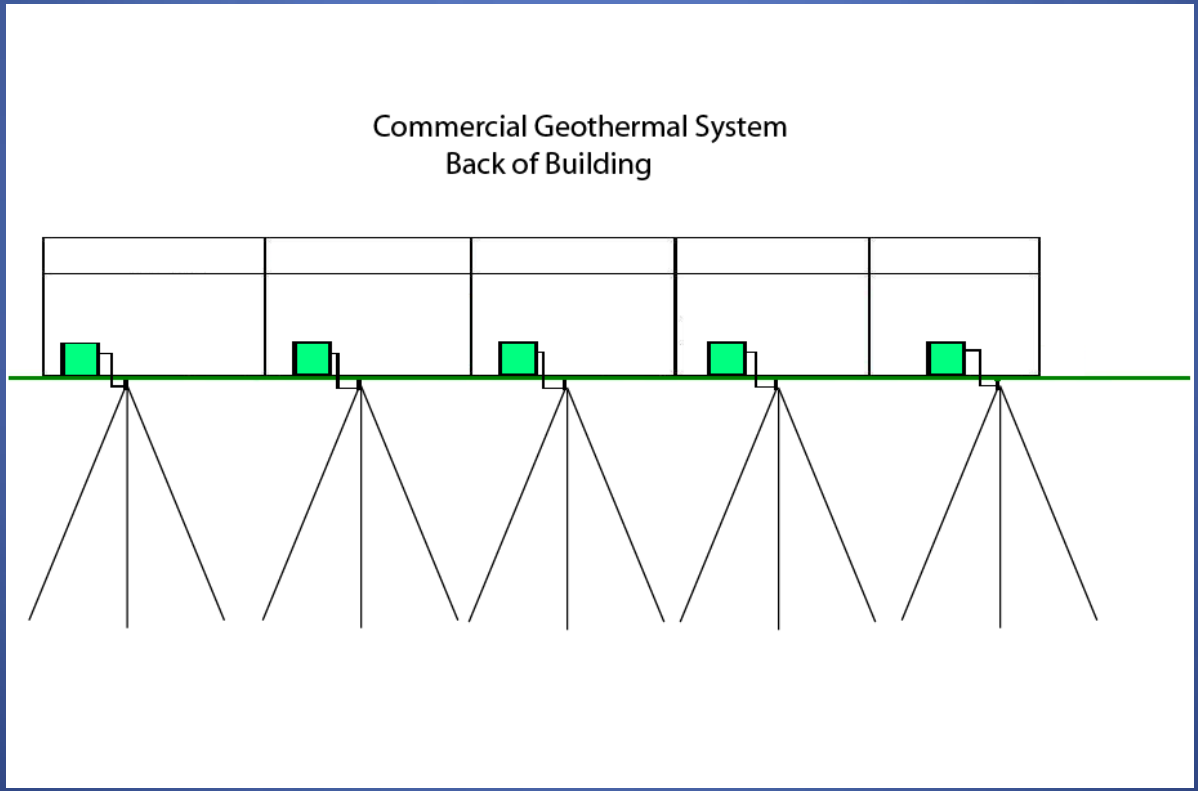
In Chicago, it's approximately 52-53°F.

Credit: NPS Photo

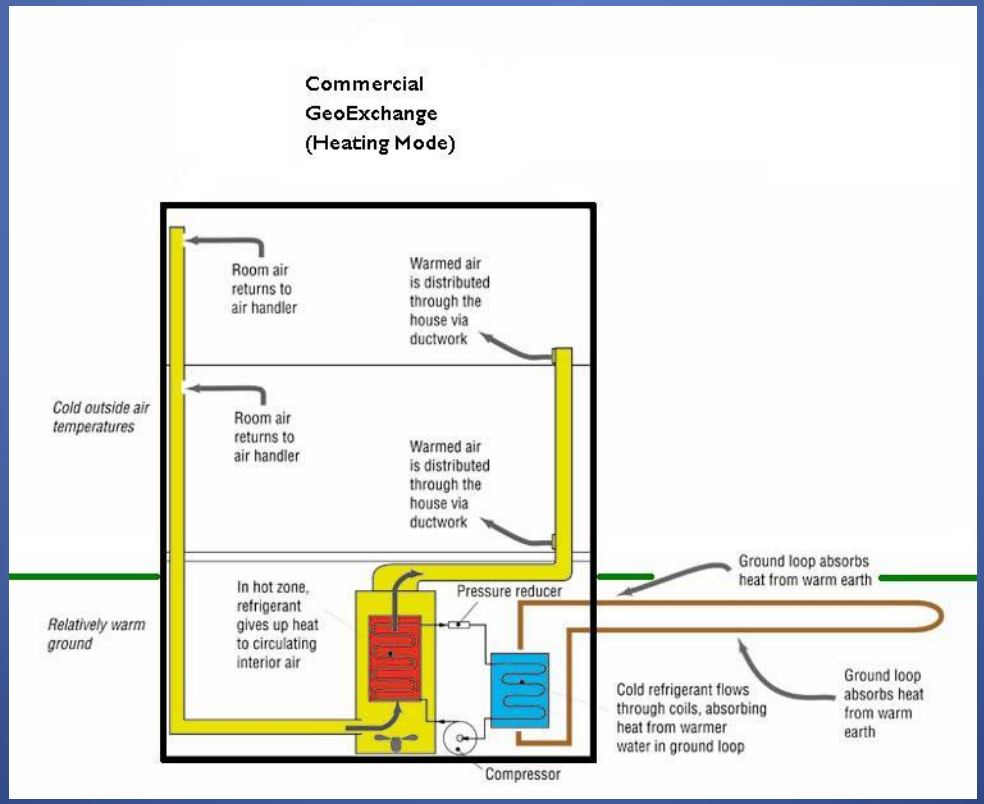
A ground source heat pump (geothermal) system can be used to extract the heating and cooling energy from the ground surrounding homes, offices, commercial and industrial buildings.



This type of system typically consists of pipes buried in the ground near the building, a heat exchanger, and ductwork into the building.

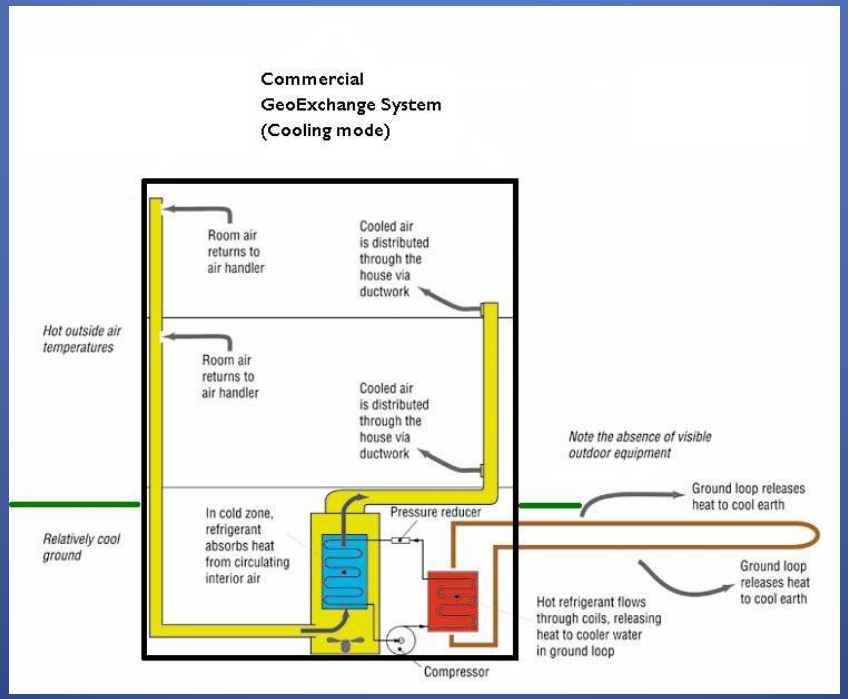


In winter, heat from the relatively warmer ground goes through the heat exchanger into the building



credit: geoexchange.org

In summer, hot air from the building is pulled through the heat exchanger into the relatively cooler ground. Heat removed during the summer can also be used as no-cost energy to heat water.



credit: geoexchange.org

Geothermal energy is …

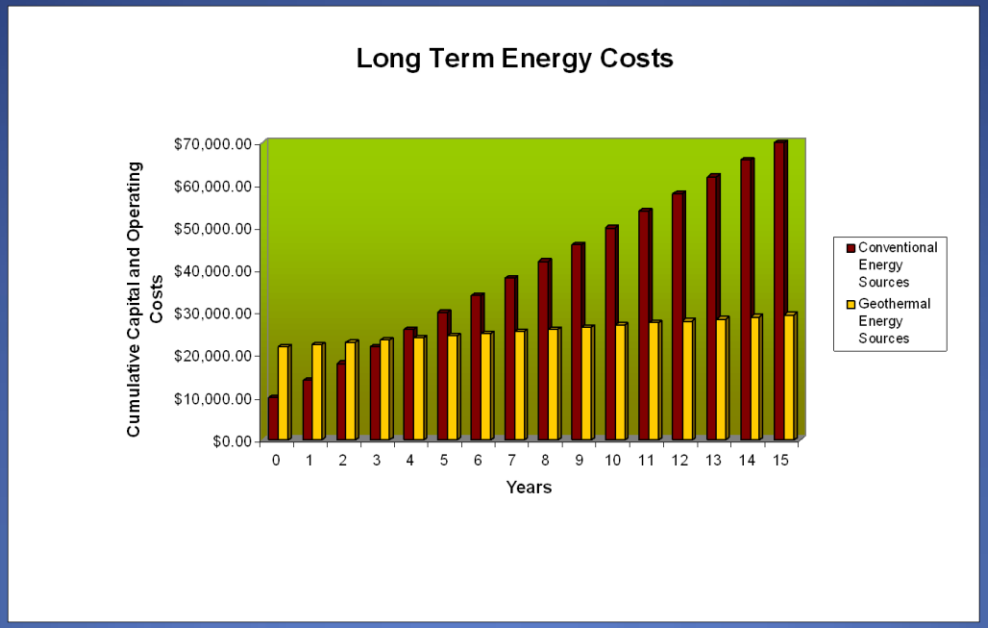
- ✓**Clean** - emits little or no greenhouse gases
- ✓**Reliable** – more than 1 million units installed. Energy is available regardless of the weather
- ✓**Homegrown** - making us less dependent on foreign oil

Geothermal energy can help you…

- **Be energy efficient** – geothermal systems use 25%–70+% less electricity and/or oil than conventional heating or cooling systems
- **Save money** – payback for initial installation costs can be as little as 3.5 – 4 years

Geothermal energy can help you…

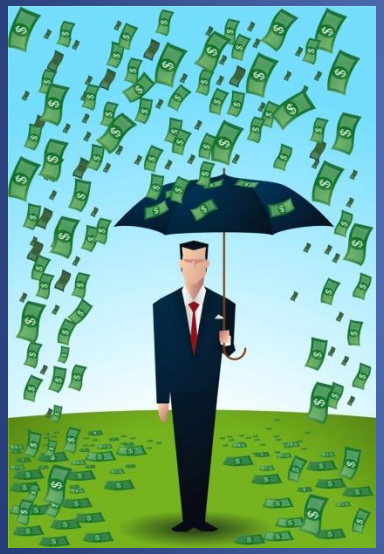
- **Be quieter** - Because they have no outside condensing units like air conditioners, there's no concern about noise outside the building. A two-speed geothermal system is so quiet inside a building that users do not know it is operating.
- **Do less maintenance** - Because geothermal systems have relatively few moving parts, and because those parts are sheltered inside a building, they are durable and highly reliable. The underground piping often carries warranties of 25–50 years, and the heat pumps often last 20 years or more.



Imagine having a choice between buying a car which is $22,000 and one which is $10,000.

The $10,000 car seems like a great deal but is a gas guzzler that needs weekly fill ups. The $22,000 car rarely needs to be refueled.

Geothermal Tax Credit Now Available



The "Emergency Economic Stabilization Act of 2008" created new Federal tax credits for homeowners and businesses who install geothermal heat pump systems.

Homeowners : 30% of the total cost of the system (maximum $2,000), for installations after January 1, 2008.

Businesses: 10% of the total cost of the system (no cap), for installations after October 3, 2008.

Be sure you check with your tax professional to see how this credit may apply to your specific situation.

HOW CAN GABRIEL HELP YOU WITH GEOTHERMAL POWER?

We partner with local firms to install geothermal systems

Perform geothermal borings

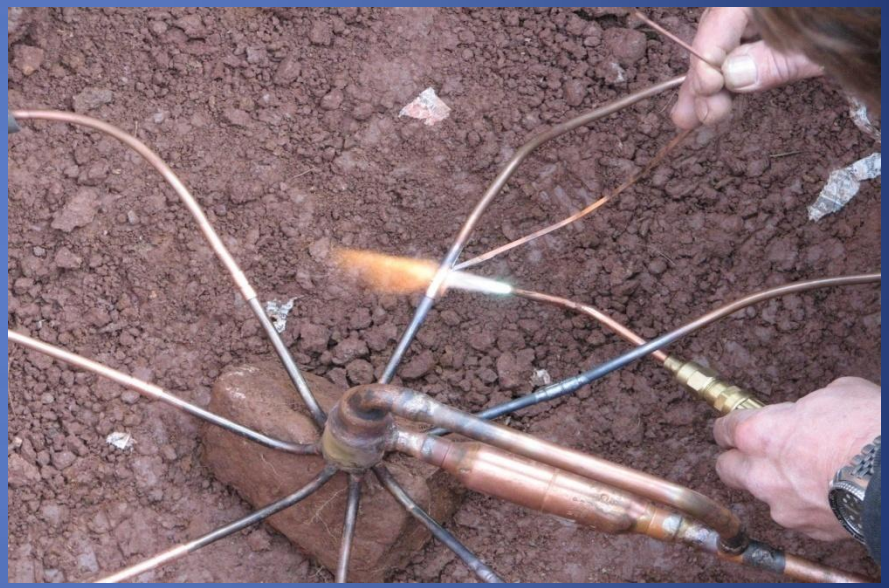
Borings are performed in a circular pattern

Install heat pump tubing after borings are completed

Completed boring with tubing. Each spoke has 2 lines – one gas line, one liquid line

The tubing from the vertical spokes all meet at a “spider” connection

Gas lines

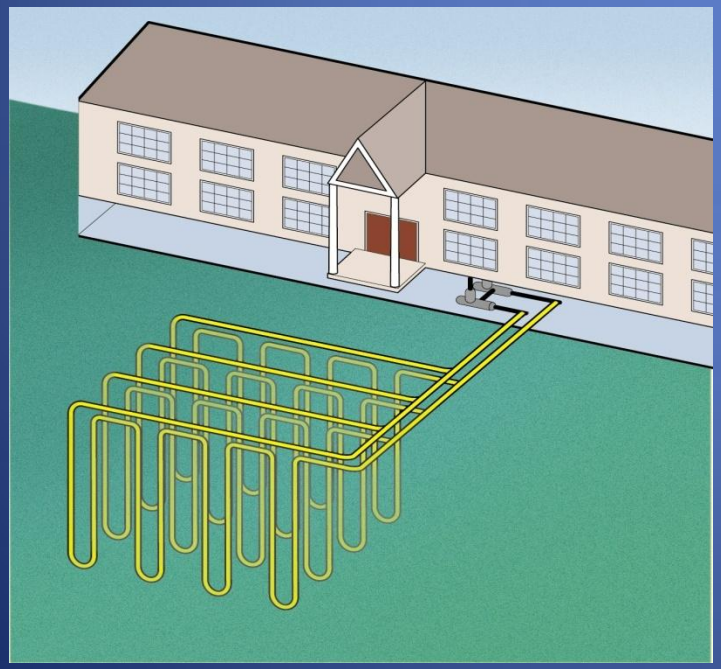


Liquid lines

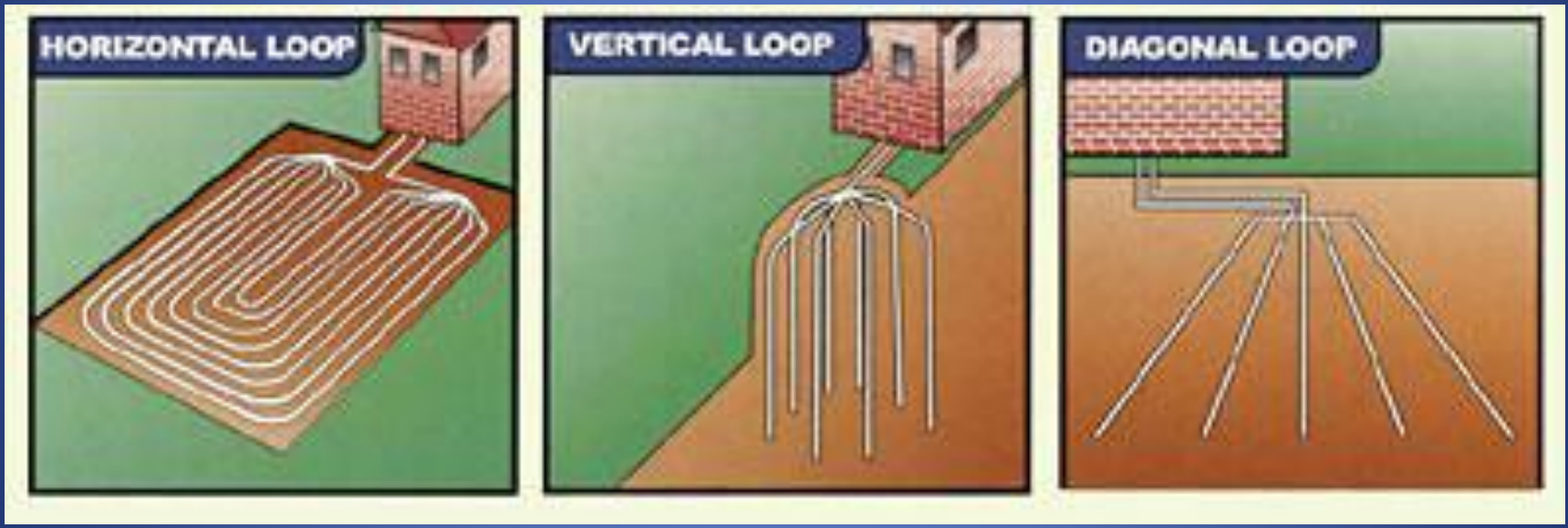
A trench is dug to connect the tubing to the equipment in the building

Connection of “spiders” to lines connecting to equipment inside the building

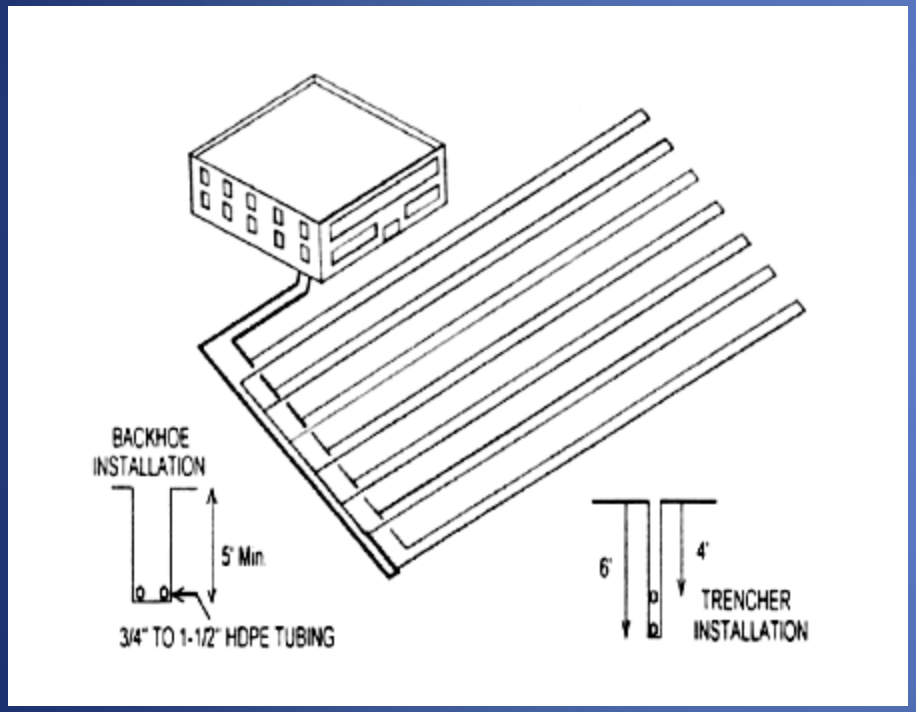
Our partners then install the rest of the necessary equipment to start heating and cooling with geothermal energy



Ground Source Heat Pump Closed Loop Options



Horizontal Loops



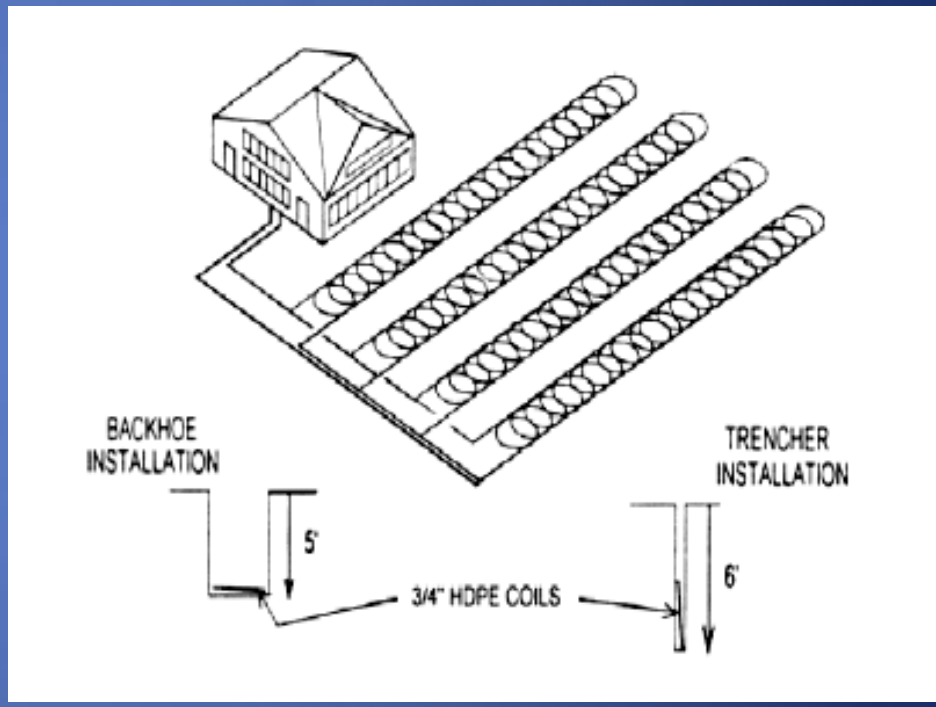
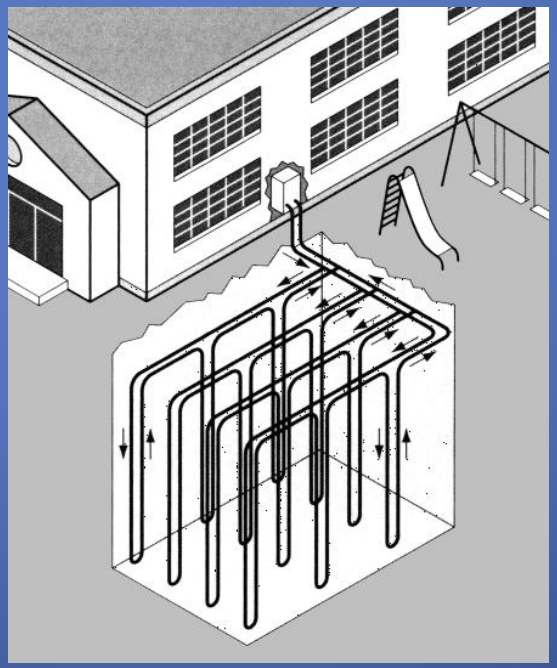


Photo credit: Geo4Va.com – a Special Energy Project funded by the U.S. Department of Energy's State Energy Program through the Virginia Department of Mines, Minerals, and Energy.

Vertical/Diagonal Loops are less invasive to install, require less land, and are a good fit for urban areas



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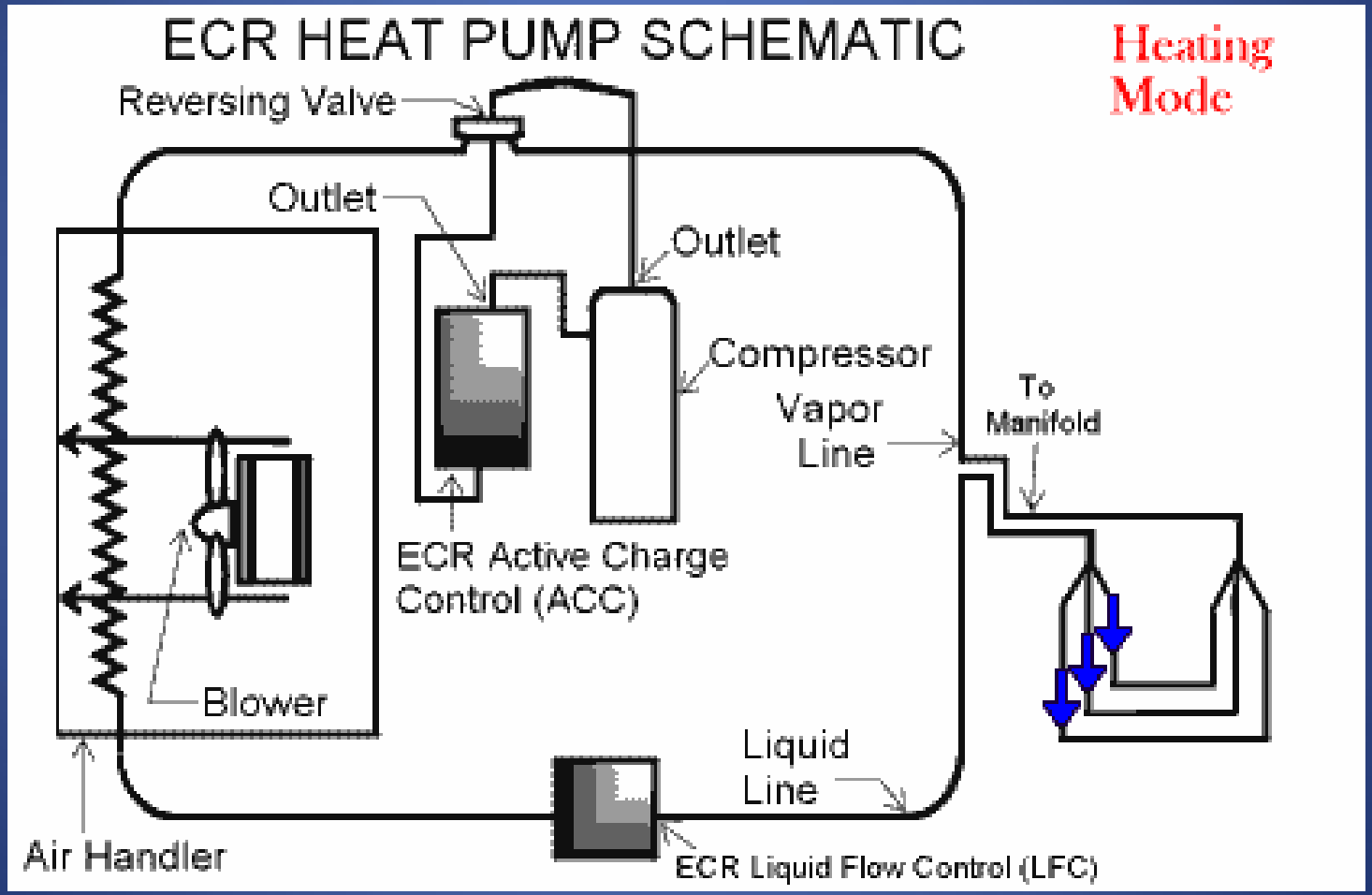
DX vs. water-based systems

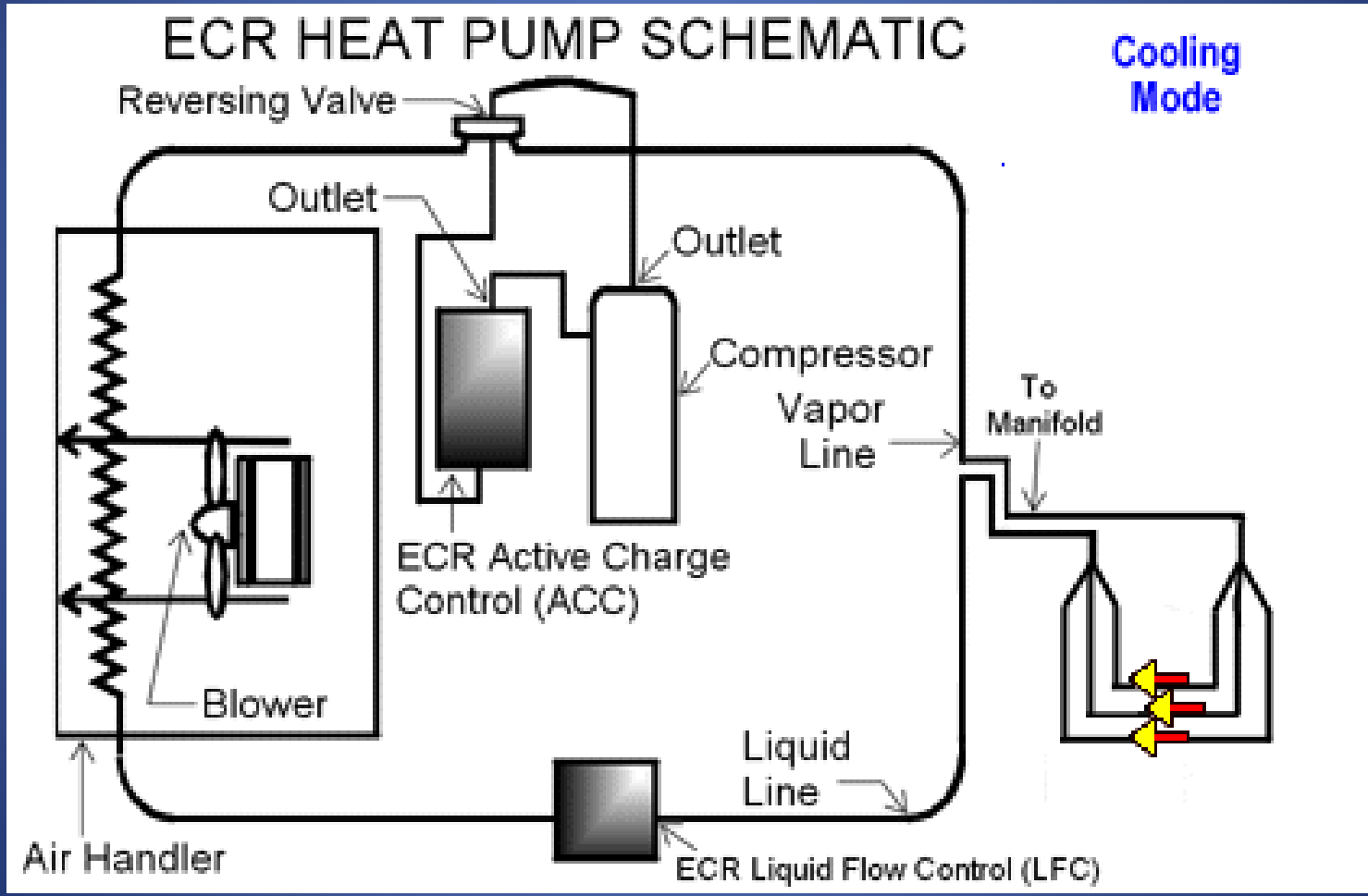
- Direct Exchange (DX) geothermal systems are more energy efficient than water-based ground source heat pumps
- Why? No heat exchanger is necessary to convert the water which was cooled/heated through piping underground to the HVAC system
- With a DX system, the HVAC system's liquid/gas non-toxic refrigerant is cooled or heated directly in the piping underground

Direct Exchange (DX) geothermal system in heating mode



Source: www.copper.org

Direct Exchange (DX) geothermal system in cooling mode



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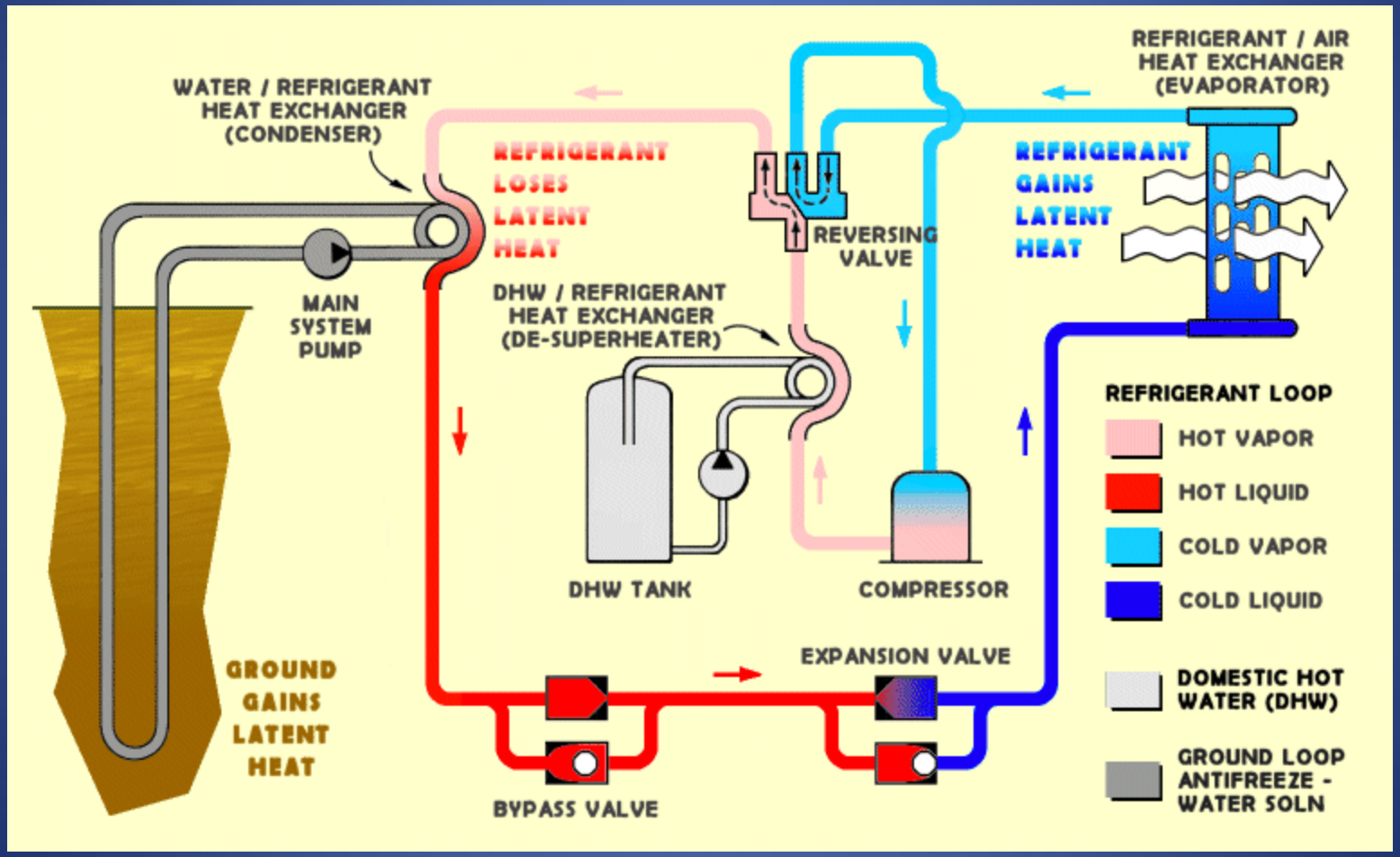
Ground source heat pump (with water) in cooling mode



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Gabriel's Geothermal Installation


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Bobcat

Questions?

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